

CLAIMS

WHAT IS CLAIMED IS:

1. A bottom tensioned riser system for conveying petroleum from an offshore oil well on a sea floor to a platform floating above, the riser system comprising:

5 a tubular conduit suspended from the platform and having a bottom end extending downward therefrom in a substantially vertical direction and toward the sea floor; and,

a connection and tensioning assembly disposed at the bottom end of the conduit, the connection and tensioning assembly comprising:

a flexible jumper connecting the bottom end of the conduit to the well;

10 a weight applying a vertical tension in the conduit; and,

means for constraining the bottom end of the conduit against horizontal movement, while enabling the conduit to move freely in a vertical direction and to pivot freely about the bottom end thereof in response to motions of the platform.

2. The riser system of claim 1, wherein the conduit comprises a plurality of individual
15 tubular riser pipes.

3. The riser system of claim 2, wherein the plurality of individual riser pipes are disposed within a single larger casing.

4. The riser system of claim 3, further comprising a core pipe surrounded by the plurality of individual riser pipes.

20 5. The riser system of claim 1, wherein the constraining means comprises a telescopic piling connected to the bottom end of the conduit by a pivot joint and slidably retained in a piling guide sunk into the sea floor.

6. The riser system of claim 5, wherein the weight is disposed on the conduit at the bottom end thereof.

25 7. The riser system of claim 5, wherein the weight is disposed in the telescopic piling.

8. The riser system of claim 1, wherein the vertical tension in the conduit is between about 1.05 to 1.2 times the weight of the conduit.

9. The riser system of claim 1, wherein the constraining means comprises:

5 a plumb bar pivotally connected to the bottom end of the conduit and having a lower end with a base plate mounted thereon, the base plate containing a plurality of apertures; and;
a guide base disposed on the sea floor and having a plurality of upstanding guide posts, each guide post being slidably received in a corresponding one of the apertures in the base plate.

10. The riser system of claim 1, wherein the constraining means comprises:

10 the weight being connected to the bottom end of the conduit by a pivoting joint;
three guide rails attached to the sea floor; and,
three rigid arms, each having an upper end pivotally attached to the weight and a lower end pivotally attached to a respective shoe, and wherein each of the shoes is retained in a corresponding one of the guide rails for horizontal movement.

15 11. The riser system of claim 1, wherein the jumper comprises steel or a flexible elastomer.

12. The riser system of claim 1, wherein the jumper includes a radial bend, and wherein the bend has a radius of about 5 - 10 times the diameter of the conduit.